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ABSTRACT

Previous research on childhood temperament has produced complex and largely unexplored heuristic models with which to understand the etiology of childhood psychopathology. Such research may help in the diagnosis of regulatory disorders in infancy and childhood, which is the focus of this paper. The recent formulation of regulatory disorders by the National Center for Clinical Infant Programs serves as a basis for examining the developmental psychology literature. The research indicates that, although temperament may be a risk factor for psychopathology, it is relatively unstable and does not carry the usual "fixedness" implied in psychopathology. Additionally, temperament has no acceptable research basis as to when it should be labeled pathological in and of itself. Likewise, the definition of regulatory disorders is problematic because the cutoffs are unclear, construct coherence is low, and relationships with existing diagnostic entities remain indistinct. Models in which temperament leads to pathological outcome suggest that it may be the parent-infant dyad that is pre-pathological and should be diagnosed. However, the interaction between temperament and caregiving should be examined for its own stability, key components, and form of pathological outcome before it is diagnostically useful. Some implications of the findings are discussed. Contains 33 references and 2 tables. (RJM)

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Temperament in Infancy and Early Childhood: Implications for the Diagnosis of Regulatory Disorders

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I will discuss temperament and regulatory disorders in infancy and early childhood because of their apparent overlap. The recent formulation of regulatory disorders by the National Center for Clinical Infant Programs (Zero to Three: National Center for Clinical Infancy Programs, 1994) will serve as a basis for examination of the developmental psychology literature on temperament and its relationship to psychopathology. Two regulatory disorders identified by "0-3", the "fearful-cautious" and the "negative and defiant" subtypes of hypersensitive infants, will serve as examples for analysis because of their similarity to constructs discussed in the temperament literature and the frequency with which they have been considered in relation to psychopathology. The following issues will be discussed: 1) instability of temperament in infancy and early childhood; 2) problems with the definition of regulatory disorders; and 3) temperament and paths to psychopathology. I will argue that the diagnosis of regulatory disorders is complicated by the instability of temperament, problems with definition of regulatory disorders, and their inconsistencies with current conceptualizations of temperament as a possible precursor of psychopathology in young children. Implications for further examination of temperament and its relationship to psychopathology

and for diagnosis in infancy and early childhood will follow the discussion of the issues.

"0-3" Classification of "Regulatory Disorders"

The "0-3" (Zero to Three: National Center for Clinical Infant Programs, 1994) diagnostic manual provides for a category of "Regulatory Disorders" to be diagnosed in infancy and early childhood. Regulatory disorders refer to difficulty regulating behavior and physiological, sensory, attention, motor or affective processes, and in organizing a calm, alert, or affectively positive state. The diagnosis requires both a distinct behavioral pattern and evidence of a sensory, sensory-motor, or organizational processing difficulty. Presumed focusing difficulties distinguish regulatory disorders from mood and anxiety disorders. Thus, it is regulatory and not a mood or anxiety disorder when there is a clearly identifiable stressor. The main classification of regulatory disorders includes hypersensitive, under-reactive, motorically disorganized and a category covering other forms.

Table 1 shows the behavioral patterns and sensory motor deficits for regulatory disorders.

[Table 1 about here]

The hypersensitive category, includes two subtypes, 1) fearful-cautious and 2) negative and defiant. Fearful and cautious describes infants who are excessively inhibited and fearful, shy with people, impulsive when frightened, easily upset and not easily soothed. The "fearful and cautious" infant's motor and sensory processes include over-reactivity to touch, loud noises, and other impinging stimuli. The second oversensitive subtype, negative and defiant, describes children who are negativistic, stubborn, defiant, controlling, avoidant or slow to engage in new experiences. The negative and defiant infant's sensory/motor processes are characterized by over-reactivity to touch and problems with fine motor coordination, despite precocious visual-spatial abilities and good muscle tone. Because of the large body of temperament literature akin to these two subtypes, I will return to a fuller discussion of the issues relating to both temperament patterns (i.e. inhibited and fussy-difficult) later.

Table 2 shows the correspondence between the two regulatory disorders and parallel temperament categories; inhibited and difficult. You can see the correspondence.

[Table 2 about here]

For each of these regulatory disorders, the authors hypothesize that particular caregiving patterns will reduce or exaggerate the disorder, although the extent to which they are modifiable is unclear.

When developmental psychologists finish reading about regulatory disorders, they are likely to be convinced that the discussion is about temperament differences. However, something new has been added. Individual differences in temperament, so vigorously studied in developmental research since the 1950's, have been pathologized.

I now turn to the body of literature on early temperament and emotional development, specifically inhibited or fussy difficult temperaments in order to highlight what is known about early changes, coherence of temperament types and models of interaction with parenting styles.

Temperament Instability

The two forms of "hypersensitive" disorders noted in the "0-3" manual, "fearful-cautious" and "negative and defiant" have parallels in the 35 year study of temperament. The "fearful-cautious" subtype appears similar to Kagan et al.'s category of inhibited infants (Kagan, 1997; Robinson, Reznick,

Kagan, & Corley, 1992; Arcus & Kagan, 1995; Reznick, Kagan, Snidman, Gersten, Baak, & Rosenberg, 1987). The main difference is that Kagan and associates view this temperament as bipolar, the other end being uninhibited infants. Inhibited infants and young children response to the unfamiliar with wariness and avoidance whereas uninhibited infants approach the unfamiliar. Stability of the uninhibited and inhibited temperaments across situations has been found to be low (Reznick, et. al., 1987). Stability over time periods ranging from 7 months to 46 months have also been found to be low to moderate, with stability only at the uninhibited end of the dimension (Kagan, Reznick, and Gibbons, 1989; Robinson, et. al., 1992; Arcus & Kagan, 1995; Reznick, et. al., 1987).

The "0-3" manual's "negative and defiant" infant has a parallel in Thomas and Chess's (1968) "difficult" infant and a more recent version by Bates et al. (Pettit & Bates, 1984) called the "fussy-difficult" infant. Bates et al. (Pettit & Bates, 1984, Lee & Bates, 1985) created a measure of the "fussy-difficult" infant, which they defined as parental perception of the difficultness of temperament (i.e., fussing/crying, unsoothability, intensity of protest, etc.). They found that the parent perception of infant difficultness showed low

correlations with coded observations of difficultness in infants and moderate stability for the parent perception measure over 18 months..

Belsky et al. (1991) have asserted that claims of impressive continuity of temperament throughout infancy and early childhood were overstated. They found that even among the most stable forms of temperament, aggregate measures of difficultness or tractability (i.e., negative, inattentive, not socially oriented), infants between 12 and 24 months became less difficult when they had mothers who were more expressive and involved and families who were more emotionally cohesive. Others researchers have found that difficultness decreased over time when mothers were more sensitive to their infants' needs (Washington, Minde, Goldberg, 1986), and that negative emotionality in infants decreased when family stress was lower (Belsky, 1984), parents were emotionally healthier, marriages were more positive in emotional tone and mothers had more harmonious interactions with their infants (Belsky, Fish, & Isabella, 1991).

The measurement of temperament and its instability pose problems for psychodiagnosis. The first is finding an accepted measure of "fearful-cautious" and "negative and defiant" temperament. Parent questionnaire and

aggregate measures may be more stable than direct observation but direct observation may identify the precise target behaviors needing modification. However, the parent perception and direct observation measures have low convergence with one another. Second, if temperament is in great flux, as much of the research suggests, then are we really dealing with disorders or, instead, with normal perturbations in behavior which lack the relative stability seen in DSM IV categories such ODD, ADHD, etc.?

Definition of Regulatory Disorder

There are a number of problems with the definition of a regulatory disorder as proposed by "0-3". The first of these is the overencompassing set of behaviors that comprise the entity. The authors state that the diagnosis requires both a distinct behavioral pattern and evidence of a sensory, sensory-motor, or organizational processing difficulty. For example, the fearful and cautious child would also be expected to show an over-reactivity to touch, loud noises and other impinging stimuli. The association between sensory processes and behavioral patterns appears untested at this time.

One major problem with this formulation is the relatively limited coherence found for the various indicators of inhibition. For example, in the

case of inhibition, there is evidence that there are only low correlations among the variables comprising the temperament category (Robinson, et al., 1992; Mullen, Snidman, & Kagan, 1993). The same low correlations can be found between measures of negative emotionality (i.e., crying) and parental perception of fussy-difficult temperament (Belsky, et al., 1991). The limited empirical coherence among emotional and behavioral measures suggests that adding a sensory component would be likely to reduce and not increase the relations among key components of temperament.

The issue of identifying appropriate cutoffs for the disorder poses another problem for diagnosis; deciding whether we are dealing with qualitative or quantitative differences. The "fearful-cautious" infant, as conceived of by "0-3", is defined by abnormally high levels of symptoms but it is unclear whether this is the high end of an otherwise normal continuum of fearfulness or whether the high end is a qualitatively distinct category. In this light, it is interesting to note that Kagan (1997) has proposed that both the highly inhibited and the highly uninhibited infants are qualitatively distinct (Kagan, Reznick, & Gibbons, 1989).

A final definitional problem is the overlap between regulatory disorders

and DSM IV categories. Do the fearful-cautious and negative defiant subtypes represent antecedents of, subsets of DSM IV or DSM-PC disorders or are they entirely distinct? For example, the DSM IV and DSM PC provide for the diagnosis of oppositional defiant disorder in early childhood. The symptoms for ODD include intense angry emotions, touchiness and easily annoyed reactions, and noncompliance. The "0-3" manual offers no comparable diagnosis except that of the "negative and defiant" infant. Are these diagnoses the same? Is the "negative defiant" disorder an etiological pathway to ODD, a subtype of ODD with sensory-motor difficulties as well, or a subgroup whose symptoms will not outlast infancy? Also, for infants, can the symptoms of "negative-defiant" disorder be differentiated from ADHD? Relationships between infant and childhood disorders need to be articulated before a concept of regulatory disorders can be fully understood.

Temperament and Paths to Psychopathology

Perhaps the most promising outcome from 35 years of research on temperament concerns the relationship between temperament and psychopathology. Developmental researchers have uniformly conceptualized the relationship between temperament and psychopathology as one in which

temperament in combination with caregiving patterns places the child at greater risk. One strength of the "0-3" formulation is the attempt to include patterns of parenting, although the specifics are largely unexplored. However, within the context of temperament there are clues.

The research from the New York Longitudinal Study (Thomas, Chess, and Birch, 1968) was among the first studies to identify the aggregated temperament category called the "difficult" child. The authors proposed that unaccepting, rigid and rejecting caregiving might result in downward spirals of negative interactions for the dyad, and eventually, individual psychopathology for the child. They found that about 70% of the difficult children later developed diagnosable disorders by the ages of 4 to 7. Most recently, Park et al. (Park, Belsky, Putnam, & Crnic, 1997) found that infants who were higher in negative emotionality (i.e., anger and hostility) at ages 2 and 3, and who had mothers and fathers who themselves expressed negative affect in response, had children who became less inhibited (i.e., less wary) at age 3. Conversely, when parents were highly responsive toward and accepting of the toddler's negative emotionality, the toddler became more inhibited by age 3. Clearly, parenting plays a role in determining whether or not a

diagnosis will be warranted.

Kagan (1997) has recently presented his theories about a small percentage of (<20%) of inhibited children who would be at greater risk for social phobias. A smaller percentage (<10%) of uninhibited children would, depending on soicalization experience, become either leaders or anti-social children. Support for the latter, i.e., maternal limits and divergent pathways to aggressivity or sociability, has begun to appear (Calkins & Fox, 1992; Fox & Calkins, 1993).

Clearly 35 years of research on temperament has given us important, if somewhat complex and largely unexplored, heuristic models with which to understand the etiology of childhood psychopathology.

Implications for Diagnosis and Research in Infancy

The implications of the temperament literature for the diagnosis of regulatory disorders in infancy and early childhood are clear: 1) temperament may be a risk factor for psychopathology but is relatively unstable and does not carry the usual "fixedness" implied in psychopathology; further, it has no accepted research basis when to be labeled pathological in and of itself; 2) the definition of regulatory disorders is problematic because the cuttoffs are

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unclear, construct coherence is low, and relationships with existing diagnostic entities are unclear; 3) models in which temperament, in conjunction with certain kinds of caregiving lead to pathological outcome, suggest that it may be the parent-infant dyad that is pre-pathological and should be diagnosed. However, the interaction between temperament and caregiving needs to be examined for its own stability, key components and form of pathological outcome before it is diagnostically useful.

Implications of the foregoing discussion for research are the following: 1) physiological measures of emotional reactivity in infancy been found to predict "difficultness" and behavior problems at age three and may improve predictive power (Porges, et al., 1994; Porges, et al, in press); 2) associations between sensory/motor patterns and temperament could be investigated; and 3) further investigation of temperament as a risk or protective factor for psychopathology, as in DSM-PC (American Academy of Pediatrics, 1996) would be more consistent with current research.

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Table 1. Criteria for "0-3" Diagnoses of Regulatory Disorders*

Type	Sub-type	Behavioral Pattern	Motor and Sensory Pattern
Hypersensitive	Fearful and Cautious	1. Excessive cautiousness 2. Inhibition and/or fearfulness	1. Over-reactive to touch, loud noises, or bright light
	Negative and Defiant	1. Negativistic 2. Stubborn 3. Controlling 4. Defiant 5. Difficulty making transitions 6. Prefers repetition to change	1. Over-reactive to touch 2. Intact visual-spatial abilities 3. Compromised auditory processing capacity 4. Good muscle tone and motor planning ability 5. Some delay in fine motor coordination
Under-reactive	Withdrawn and Difficult to Engage	1. Seeming Disinterest in relationships 2. Limited exploratory activity or flexibility in play 3. Appear apathetic 4. Easily exhausted and withdrawn	1. Under-reactivity to sound and movement in space 2. Either over-reactive or under-reactive to touch 3. Intact visual-spatial processing capacities but auditory-verbal processing difficulties 4. Poor motor quality and motor planning
	Self-absorbed	1. Creative and imaginative with a tendency to tune into his or her own sensations, thoughts and emotions	1. Decreased auditory-verbal processing capacities
Motorically Disorganized, Impulsive		1. High activity, seeking contact and stimulation through deep pressure 2. Appears to lack caution	1. Sensory under-reactivity 2. (hi) motor discharge
Other		(Behavior patterns not adequately described by one of the three subtypes)	(Meets criterion for regulatory disorder, i.e., motor or sensory processing difficulty)

* Adapted from Appendix 3, pp. 77-79.

Table 2. Criteria for "0-3" Diagnoses of Hypersentive Regulatory Disorders As Compared with Research Definitions of Inhibited and Difficult Temperaments

Diagnosis	Behavioral Pattern	Motor and Sensory	Temperament	Behavior Pattern
Fearful and Cautious	1. Excessive Cautiousness 2. Inhibition and/or fearfulness	1. Over-reactive to touch, loud noises, or bright lights	Inhibited	1. Failure to approach an unfamiliar object or person (at 4 & 14 mos.) 2. Fretting or crying to any unfamiliar event (4 & 14 mo (Arcus & Kagan, 1995) 3. High and stable heart rate, larger pupillary dilation to cognitive stress (Reznick, et al.1987)
Negative and Defiant	1. Negativistic 2. Stubborn 3. Controlling 4. Defiant 5. Difficulty making transitions 6. Prefers repetition to change	1. Over-reactive to touch 2. Intact visual-spatial abilities 3. Compromised auditory processing 4. Good muscle tone and motor planning ability 5. Some delay in fine motor coordination	Difficult	1. Fussing/ crying 2. Changeable mood 3. Unsoothability 4. Overall difficulty 5. Frequent fussing each day (6, 13, & 14 mos.) (Lee & Bates, 1985)

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